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1970
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~~O.W.R.C.~~
~~Water Pollution~~
~~Survey~~

THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION & SANITARY SURVEY

of the

COMMUNITY OF NOELVILLE

DISTRICT OF SUDBURY

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R E P O R T

on

WATER POLLUTION and SANITARY SURVEY

of the

COMMUNITY OF NOELVILLE

(Township of Cosby, Mason and Martland)

District of Sudbury

May, 1970

Ontario Water Resources Commission

District Engineers Branch

Division of Sanitary Engineering

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R E P O R T

ONTARIO WATER RESOURCES COMMISSION

I SUMMARY

A sanitary and water pollution survey was conducted in the Community of Noelville on May 5 and 7, 1970, by the Ontario Water Resources Commission's Division of Sanitary Engineering. The sanitary survey revealed that all residences involved in this sampling programme obtained potable water from either drilled or dug wells. During the survey a set of chemical samples were obtained from two drilled and one dug well located within the Community and sent to the OWRC Toronto Laboratory, in Toronto, for analyses. These results indicate that the water was acceptable for domestic consumption. This, in conjunction with an ample supply of sanitary groundwater would indicate that the Community of Noelville has no immediate need for a communal water works system.

The analytical results of the chemical and bacteriological samples obtained during the pollution survey indicate that raw sewage is being discharged to Wolf River by a large number of homes situated on the north bank of the watercourse. In addition, storm sewers draining the built-up area of the Community are receiving a substantial amount of sanitary wastes. Due to the relatively small size of the lots situated within the Community the installation of septic tank systems appears to be an unsatisfactory solution to the above problem. It is therefore recommended that communal sewerage facilities be provided in the municipality to alleviate the present unacceptable and potentially harmful conditions.

II INTRODUCTION

A water pollution and sanitary survey was conducted in the Township of Cosby, Mason and Martland (formerly the Police Village of Noelville)

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during the spring of 1970. Samples were initially collected on May 5th. to locate and evaluate all existing sources of pollution and to determine the extent of pollution of Wolf River. On May 7th samples were obtained in order to assess the quality of the existing drinking water supplies. Such surveys are performed routinely and on request by the Ontario Water Resources Commission's Division of Sanitary Engineering as a basis for determining water supply and sewage requirements.

III GENERAL

The Community of Noelville* is located in the south-eastern sector in the Township of Cosby, Mason and Martland. It is readily accessible via highway from the Junction of Highways No. 64 and 535 which connect with Highways 69 and 17 respectively.

Geographically, the entire District of Sudbury is underlain with precambrian rocks of the Canadian Shield, with the depth and composition of the overburden varying throughout the District. Within the Community of Noelville, the overburden varies from a gravelly composition to a sandy loam depending on the location. A small watercourse (Wolf River) flows through Noelville in a south-easterly direction, eventually joining the Wolseley River at a point just east of the Community of Chartrand Corner. Wolseley River is part of the French River system which flows to the Georgian Bay of Lake Huron.

It was established that the population of the Community of Noelville was 749 at the time of the survey.

The tourist trade is a major contributor of income for many of the residents of Noelville during the summer. There is a major cottage development located in the proximity of the North Channel of the French River.

*Note: On January 1, 1970, the Police Village of Noelville reverted as part of the Township of Cosby, Mason and Martland. Through the body of this report the above will be referred to as the Community of Noelville.

However, the majority of the local labour force is employed by the International Nickel Company of Canada in Sudbury. Others are hired as members of construction crews working in the area.

IV EXISTING SERVICES

At present, there are no municipal water works or sewage treatment facilities in the Community of Noelville. Drinking water is obtained from individual privately-owned dug or drilled wells. The dug wells are roughly 20 feet deep; whereas, the drilled wells may vary in depth from 195-333 feet. The water is not treated prior to consumption.

Disposal of sanitary wastes is effected by individual septic tank systems. Pit privies are used by a minority of the residents.

V DISPOSAL OF STORM RUNOFF

The devloped area of the community is served with a system of storm sewers which direct the surface water to the Wolf River. In some cases ditches form part of the drainage pattern. Figure one delineates the sewers which constitute the system.

VI WATER USES

Wolf River is not used for recreational or domestic purposes because of its limited flow. However, it is conceivable that the river can be used for agricultural purposes due to its locality and water quality.

VII SANITARY SURVEY

a) Field Work

The field work associated with the sanitary survey was conducted on May 7, 1970. During the survey a total of eleven homes were visited in order to generally assess the bacteriological quality of the drinking water supplies serving the community. Three sets of chemical samples; two from drilled wells and one from a dug well were submitted to the OWRC Laboratory for a complete

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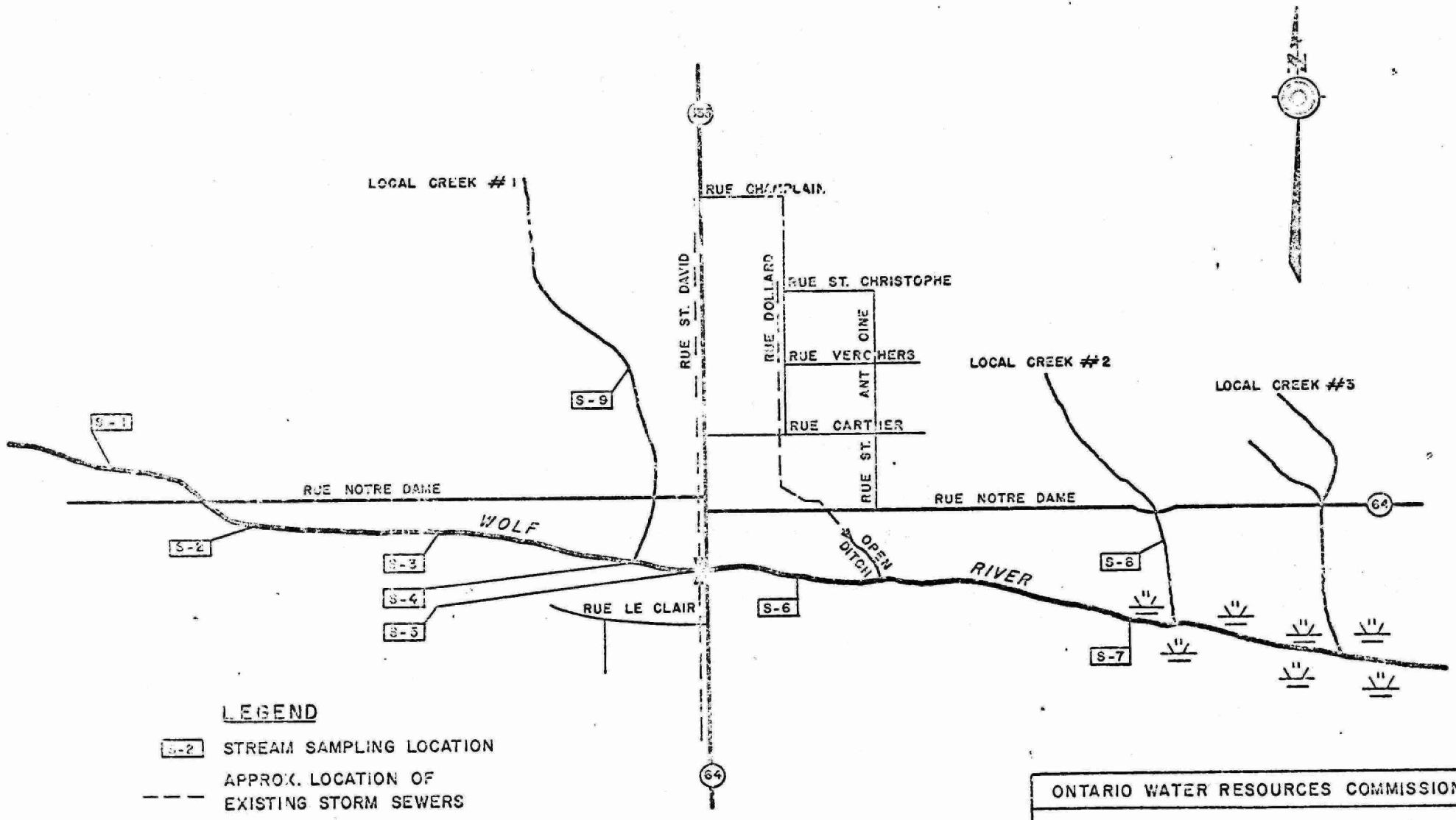
3 (a)



ONTARIO WATER RESOURCES COMMISSION

TWPS. OF COSBY, MASON AND MARTLAND

COMMUNITY OF NOELVILLE

FIG. 1

SCALE: NOT TO SCALE	
DRAWN BY: R. HUNT	DATE: JULY, 1970
CHECKED BY: H. KRESIN	DWG. Nº: 70-114-DE

spectrum analysis.

A copy of the information sheet used to gather statistical information during the survey is appended to this report. (Appendix I)

b) Presentation of Results

Bacteriological

Analytical results of bacteriological samples obtained during the sanitary survey indicated the presence of coliform organisms in three (or 27 per cent) of the samples. The density of coliform organisms ranged from 10 to 310 per 100 ml of sample and the presence of faecal coliforms (2 organisms per 100 ml of sample) was indicated in one of the dug well samples.

The results of the analyses performed on the bacteriological samples are summarized in Table I and their significance is outlined in Appendix II.

Chemical

The analytical results of the chemical samples obtained during the sanitary survey indicate that the chemical quality of the private drinking water supplies (drilled and dug wells) serving the community was satisfactory at the time.

The results of the analyses performed on the chemical samples can be found in Table II and their significance is outlined in Appendix II.

c) Explanation of Results

As indicated in the preceding section, the chemical quality of the drinking water supplies sampled during the survey is satisfactory, exhibiting properties common to most ground water supplies in the area.

The presence of coliform organisms in three of the eleven well supplies sampled could possibly be attributed to poor well construction. Problems of this nature can be corrected on an individual basis, thus

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eliminating the need for a municipal water works system.

d) Discussion

The need of a municipal water works system for the Community of Noelville is not critical because an abundant supply of good quality groundwater is readily available on an individual basis in the vicinity. The analytical results of the chemical and bacteriological samples obtained during the survey showed the water quality to be generally satisfactory. None of the chemical constituents exceeded the OWRC's objectives for potable water. Three of the supplies (or 27 per cent) showed the presence of coliform organisms indicating the need for disinfection at these installations.

VIII POLLUTION SURVEY

A) Field Work

The field work associated with this survey was carried out on May 5, 1970. The rainy weather prevented sampling until later in the day.

A total of 14 bacteriological and chemical samples were obtained during the survey. Of these samples, nine were obtained directly from Wolf River and its tributaries; four from outfalls discharging to the above watercourse and one from a ditch discharging into the river.

Visual evidence of pollutants entering Wolf River was noted along both shorelines of the watercourse. Sanitary sewage is discharged to the river through plastic pipes from a number of homes situated along Rue Notre Dame. Two large outfalls of unknown origin were contributing heavily to the pollution of Wolf River by discharging large volumes of pollutants to one of the natural tributaries (local creek No.1) of the watercourse.

Many of the members of the community interviewed during the surveys confirmed that a great percentage of the town utilized the storm

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sewers to dispose of kitchen and laundry wastes.

b) Presentation of Analytical Results

Bacteriological examination of the nine samples obtained from the Wolf River indicated that 67 per cent exceeded the criterium of 2400 total coliform organisms (TCO) per 100 ml of sample, for watercourses. All of the adverse samples contained faecal coliform organisms. TCO and faecal coliform counts ranged from 170 to 14,800 and 10 to 2700 organisms per 100 ml of sample respectively.

Examination of the bacteriological samples obtained from four outfalls and one road-side ditch discharging into the River indicated the presence of raw sewage in all cases. TCO and faecal coliform counts ranged from 3,500,000 to 107,000,000 and 100,00 to 1,300,00 organisms per 100 ml of sample respectively.

Chemical samples were obtained at the same locations as the bacteriological samples. The results of these analyses indicated a gradual degradation in the water quality of Wolf River as it flowed through Noelville. Presence of raw sewage was evident in the effluents of all four outfalls. The results of the road-side ditch contents also revealed the presence of raw sewage. The highest BOD value in the Wolf River was obtained at its junction with the local creek No. 1.

Bacteriological and chemical results of the analyses of the 14 samples obtained during the pollution survey are presented in Tables III and IV respectively.

c) Explanation of Results

Analyses results of both chemical and bacteriological samples obtained from the portion of Wolf River running through Noelville and its associated local creeks indicated the presence of raw sewage in all cases.

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The BOD and faecal coliform concentrations at some locations resembled those normally associated with raw sewage analyses.

The sanitary wastes are gaining access to the river via a large number of private outfalls serving the residences located along the north bank of the Wolf River (Rue Notre Dame), two large private outfalls located behind the intersection of Rue St. David and Rue Notre Dame (discharging into local creek No.1) and a municipal storm sewer running through the built-up area of the community. The latter eventually discharges to a ditch located on the south side of Rue Notre Dame west of Rue St. David and empties into the Wolf River.

It was also noted during the pollution survey that many of the road ditches located within the community and emptying into Wolf River also contained domestic wastes.

d) Discussion

Analytical results of the chemical and bacteriological samples obtained during the above survey indicate that domestic wastes from the Community of Noelville are gaining access to Wolf River via numerous private outfalls, a municipal storm sewer, several road ditches and two local creeks. It is evident that the disposal of wastes by septic tanks is failing due to malfunctions or the use of small (average of 0.125 acres) lots in the community. Because of water quality deterioration and the health hazards associated with the existing situation, the Community of Noelville should install a sewage treatment facility with an associated collector system.

IX CONCLUSION

The analytical results of the bacteriological and chemical

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samples obtained during the sanitary survey indicated a generally satisfactory water quality and the disinfection of the few adverse supplies could be carried out on an individual basis. The water quantity appeared to be adequate as well. It is therefore concluded that a municipal water supply system is not required.

The presence of raw sewage in the local ditches and outfalls is causing a deterioration of the local natural watercourses and presents a potential health hazard. It is recommended that a sewage collector system with an appropriate treatment facility be installed to alleviate this situation without delay.

RECOMMENDATIONS

It is recommended that a municipal sewage treatment facility and collector system be installed as soon as possible, and that the disinfection and revamping of well supplies be carried out on an individual basis as required.

Prepared by:

D. L. Lampman, Student Eng.,
District Engineers Branch,
Division of Sanitary Engineering

APPENDIX 1

Sanitary SURVEY

COUNT		
RECEIVED	DISCARDED	TOTAL
0	0	0

DISTRICT/COUNTY Sudbury TOWNSHIP/MUNICIPALITY Cosby, Mason & Martland (Noelville)

A. OWNER - NAME R. Prevost DATE May 7, 1970

- MAILING 55 Rue Dollard INSP.

ADDRESS Noelville

B. LOT - SIZE 50 x 100 AREA 0.125 acres TOPSOIL sandy loam DRAINAGE OK

COMMENTS

C. SEWAGE DISPOSAL - TYPE Septic Tank CONNECTIONS Separate

- INSTALLATION DATE 1967 H.U. APPROVAL No

- DISCHARGE Tile Field PROBLEMS No

COMMENTS Pumped out every year

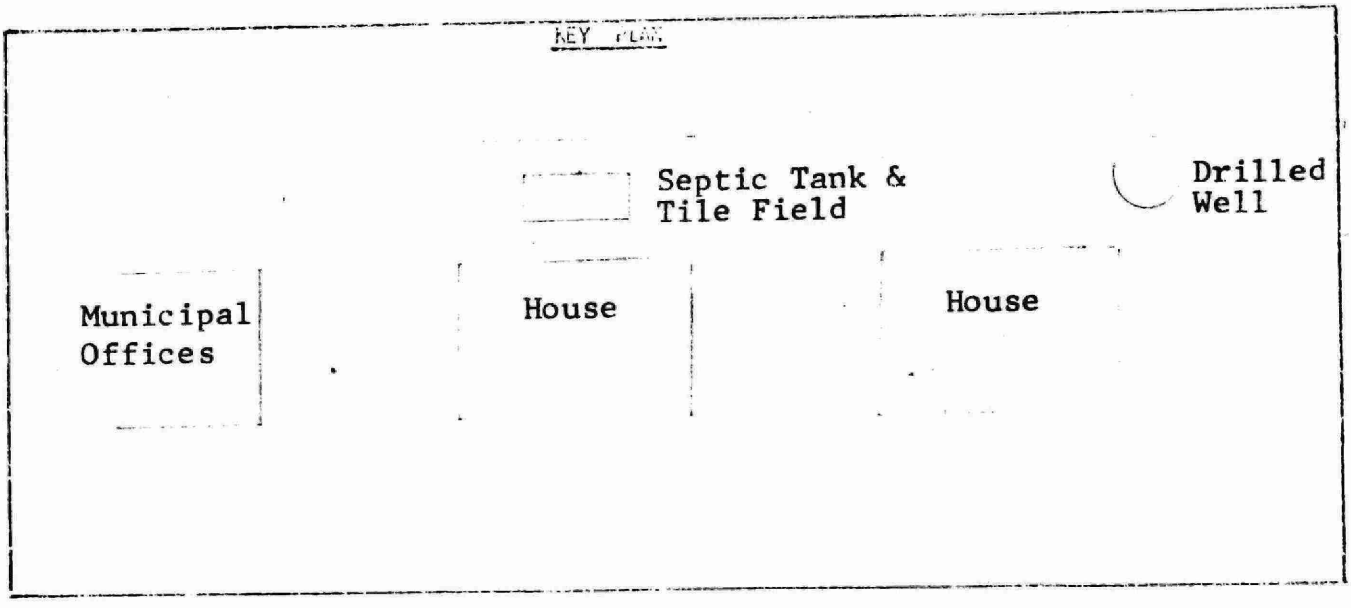
D. WATER SUPPLY - SOURCE Drilled PRIVATE CommUNAL x NO. OF CONNECTIONS 2

- CONSTR. DATE 1967 QUANTITY OK QUALITY OK

COMMENTS Neighbour owns well: Lucien Carriere

E. SAMPLES OBTAINED - BACTI x LOC. Kitchen Tap CHEM LOC.

KEY PLAN



APPENDIX II

DEFINITION OF TERMS

BOD (Biochemical Oxygen Demand)

The Biochemical Oxygen Demand (BOD) is a measure of the amount of oxygen required for the natural stabilization of decomposable organic matter present in sewage. OWRC objectives allow concentrations in natural waters and waste discharges of no greater than 4.0 and 15.0 ppm (parts per million) respectively.

COD (Chemical Oxygen Demand)

The Chemical Oxygen Demand (COD) is a measure of the amount of oxygen required for the chemical oxidation of all organic matter to carbon dioxide and water. It is a test widely used as a means of measuring the pollution strength of domestic and industrial wastes.

NITROGEN (Total Kjeldahl)

Total Kjeldahl is a measure of the total nitrogeneous matter present in a sample with the exception of that measured as nitrate and nitrite nitrogen. Total Kjeldahl less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. Normal concentration of total Kjeldahl in natural water bodies are usually in the range of from 0.1 to 0.5 ppm.

PHOSPHORUS AS P

Phosphorous occurs in natural and waste waters in several different chemical combinations, such as orthophosphate (PO_4), organic phosphorus, and polyphosphate. It is an essential plant nutrient and is believed to play an important role in the deterioration in the quality of natural waters by promoting an overabundance of plant growth. Normal concentrations of phosphorous in ground and surface

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waters are usually less than 0.15 ppm. It has been suggested in the literature that more than 0.2 ppm of phosphorus in a water source indicates that some phosphorus of sewage origin is present.

ABS (Alkylbenzene Sulphonate)

The Alkylbenzene Sulphonate (ABS) is a surfactant extensively used in detergents and so is present in domestic sewage at levels averaging approximately 10 ppm. Rivers usually contain trace quantities of about 0.1 ppm while ground water supplies range from zero to several parts per million depending upon the pollution of the aquifer by domestic wastes.

SOLIDS

The solids content of a liquid is expressed as total, suspended and dissolved solids. The latter is determined by subtracting the first two solids and all three are expressed in ppm. The suspended solids figure is the most important since it represents that portion which is carried down-current and later deposited. The OWRC's objective for discharge of this material is a concentration less than 15 ppm.

COLIFORMS

Coliform bacteria are commonly found in the intestinal tract of man and other animals. They are therefore used as an indication of pollution. In polluted water, their concentration is roughly proportional to the degree of sewage contamination present. The acceptable limit for natural watercourses is a concentration of less than 2400 organisms per 100 millilitres of water.

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FECAL COLIFORMS

The fecal coliforms are coliform bacteria usually associated only with the fecal discharges of man and other warm blooded animals and as such their presence indicates positive excretion into the water body. When this coliform is present in a water, it is assumed that the water is potentially dangerous.

TABLE I

Bacteriological Analyses Results

Sanitary Survey

Location	Supply	Fecal Coliforms	Background Colonies *	Total Coliform Bacteria
Mr. Brunet	dug well	0	132	0
Mr. Pomerleau	drilled well	0	6	16
Mr. Davidson	dug well	0	7,600	310
Mr. Prevost	drilled well	0	0	0
Anne's Snack Bar	drilled well	0	0	0
LCBO Bldg.	dug well	0	0	0
Lafayette Hotel	drilled well	0	0	0
Mr. Potvin	drilled well	0	32	0
Mr. Gouin	dug well	2	166	10
Mr. Carriere	drilled well	0	0	0
Mr. Dupuis	dug well	0	0	0

*BACKGROUND COLONIES - Background Colonies indicate the presence of bacteriological forms of undefined type normally not constituting a health hazard. Their presence suggests an undesirable situtation in the supply or distribution system.

TABLE II

CHEMICAL ANALYSES RESULTS - SANITARY SURVEY

LOCATION	SOURCE	TREATMENT	HARDNESS AS $CaCO_3$	ALKALINITY AS $CaCO_3$	IRON AS Fe	CHLORIDE AS Cl	PH AT LAB	FLUORIDE AS F	APPARENT COLOUR UNITS	TURBIDITY UNITS	MANGANESE AS Mn	ZINC AS Zn	ARSENIC AS As
ANNE'S SNACK BAR	DRILLED WELL	SOFTENING	2	293	<0.05	95	7.2	0.2	<5	1	0.0	0.0	0.0
LAFAYETTE HOTEL	DRILLED WELL	NIL	100	119	0.30	5	8.0	0.1	<5	3	0.0	0.06	0.0
LCBO BUILDING	DUG WELL	NIL	180	139	0.10	32	7.4	0.1	5	1	0.0	0.72	0.0

NOTE: ALL ANALYSES EXCEPT PH REPORTED IN PPM UNLESS OTHERWISE INDICATED.

TABLE III

Bacteriological Analyses Results

Pollution Survey

Location	Number	Fecal Coliforms	Total Coliforms
North Side of Rue Notre Dame	S-1	70	170
South Side of Rue Notre Dame	S-2	<10	580
South Side of Rue Notre Dame	S-3	<10	260
Junction of Local Creek No.1 and Wolf River	S-4	280	5,700
Rue St. David Bridge	S-5	100	9,800
Wolf River at Noelville Cemetary	S-6	70	4,000
Local Creek No.2	S-7	500	4,300
Wolf River Upstream of Local Creek No.2	S-8	2,700	14,800
Local Creek No.1		270	2,700
Private Outfall - North Side of Rue Notre Dame	O-1-P	130,000	107,000,000
Outfall-Municipal Storm Sewer	O-2-S-W	51,000	1,160,000
Private Outfall - Local Creek No. 1	O-3-S	77,000	1,150,000
Private Outfall - Local Creek No. 1	O-4-S	100,000	5,300,000
Local Ditch - Running from Rue Le Clair to Wolf River	D-1	3,000	2,500,000

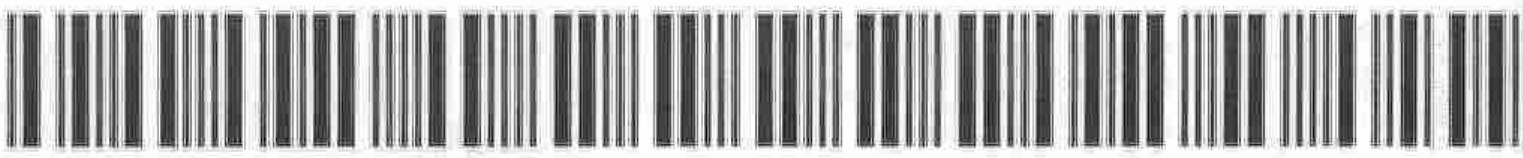
TABLE IV

Chemical Analyses Results - Pollution Survey

Location	Number	BOD	Suspended Solids	Total Kjeldahl as N	Phosphorous as P	COD	ABS
North Side of Rue Notre Dame	S-1	1.8	10	0.25	0.05	-	-
South Side of Rue Notre Dame	S-2	2.0	15	0.66	0.096	-	-
South Side of Rue Notre Dame	S-3	2.0	15	1.0	0.11	-	-
Junction of Local Creek No. 1 and Wolf River	S-4	18.0	10	0.70	0.14	-	-
Rue St. David Bridge	S-5	2.0	10	0.86	0.10	-	-
Wolf River at Noelville Cemetary	S-6	1.8	10	0.60	0.11	-	-
Local Creek No. 2	S-7	2.5	10	1.1	0.25	-	-
Wolf River Upstream of Local Creek No. 2	S-8	1.6	10	1.1	0.21	-	-
Local Creek No. 1	S-9	2.5	18	0.36	0.11	-	-
Private Outfall-North Side of Rue Notre Dame	0-1-P	160	2,040	16.0	9.0	-	6.0
Outfall - Municipal Storm Sewer	0-2-S-W	60	220	19.0	613	-	2.3
Private Outfall - Local Creek No. 1	0-3-S	140	3,030	33.0	5.2	220	-
Private Outfall- Local Creek No. 1	0-4-S	75	165	21.0	8.4	210	-
Local Ditch-Running from Rue Le Clair to Wolf River	D-1	200	550	4.5	1.5	-	-

All Analyses reported in ppm unless otherwise indicated.

- Indicates analyses not performed.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